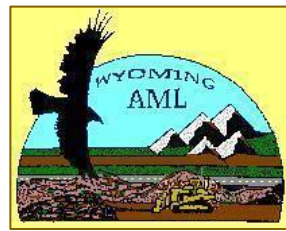


AML Project 17.6B

Glenrock Emergency Subsidence Mitigation

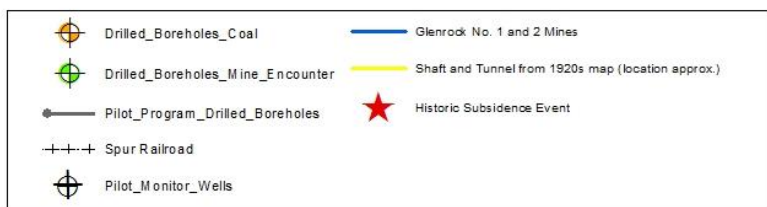
Fact Sheet



- AML Project 17.6B Emergency Grouting is being conducted at the intersection of Millar lane/Mormon Canyon Road and the I-25 Bypass (SH 20-26-87) in east Glenrock and extending east approximately 500 feet from the intersection, encompassing an area of roughly 0.67 acres (Figure 1).
- The first documented coal production in the Territory of Wyoming occurred near here in 1847. Commercial mining by room and pillar methods in No. 1 and 2 mines which underlie the area, 1888 - 1908 in coal seam averaging 6 to 7 feet thick.
- Sinkhole subsidence event in May 2016 led to investigations and subsequent discovery of previously undocumented mine workings at shallow depth beneath the I-25 Business Route through Glenrock. This road also serves as State Highways 20, 26 and 87 and is the main road in the area receiving a considerable amount of traffic, including frequent large, heavy loads.
- Emergency grouting was initiated by AML in November to infill shallow mine openings located beneath these critical roadways and provide ground support prior to spring. The spring and early summer months commonly see an increase in subsidence incidents in Wyoming as the ground has thawed and groundwater is generally at higher levels.
- Emergency grouting has included drilling more than 130 boreholes (Figure 2). This required coordinating with WYDOT and GE Wind for temporary lane closures while drilling and grouting directly beneath the highway.
- Open voids due to underground mine workings have been encountered as shallow as 11 feet below the roadway at the intersection of Millar Lane and SH 20-26-87/I-25 Business Route.
- To date, a total of more than 1100 cubic yards of grout has been injected during the current work.
- More than 200 cubic yards of grout has been injected through a single borehole. For a mined seam thickness of 6 feet, this corresponds to a void with an equivalent area larger than 30 feet x 30 feet.
- Emergency grouting is expected to continue through the middle of February.
- A bid package will be prepared to address the remaining undermined portions of the highway that require additional subsidence mitigation during the 2017 spring – summer construction season. This is anticipated to total more than 2,000 feet of highway.
- Contemporary grouting practices offer superior levels of execution and verification and include the use of varieties of complementary grout mixes; containing less cement to reduce cost, and more fly ash to enhance the flowability of the grout. The use of these practices will enable more thorough mitigation of these areas to be achieved than was previously possible.
- The engineering team is conducting Glenrock-specific testing on the beneficial use of fly ash from the Dave Johnston generating station in the grout mix. The fly ash produced at this coal-fired plant is currently placed in a landfill at the plant. Being able to use this local material in the grout mix would provide significant cost savings, while simultaneously saving landfill space.



Figure 1 – Emergency Grouting Project Location, East Glenrock, WY



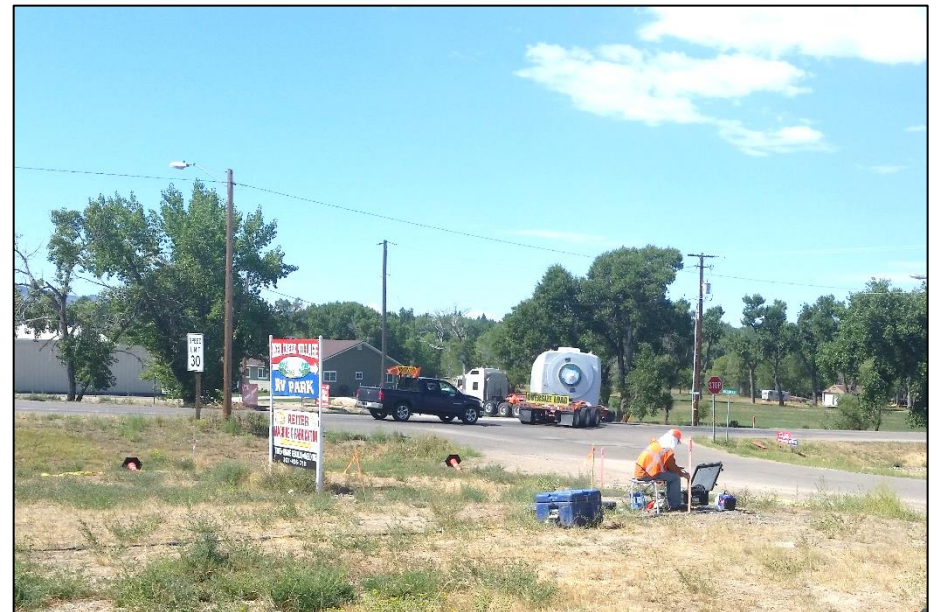
0 20 40
Feet



Figure 2 – Emergency Grouting Area Detail

State Highway 20-26-87/I-25 Business Route

Main artery through the area that is subject to a considerable amount of traffic. This includes heavy transports for the wind turbines at two separate wind farms under construction in 2106; one several miles south on Mormon Canyon Road, and the other northwest of Glenrock in the Rollins Hills area.



Traffic Control During Grouting Operations

Single lane closure with automated signal light coordinated and permitted with WYDOT, and with GE Wind.

